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Digital Overuse and Subjective Well-Being in a Digitized Society

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Abstract

In modern everyday life, individuals experience an abundance of digital information and communication options, and pressure to use them effectively and constantly. While there are many benefits attainable through the use of digital information and communication technologies (ICTs), digital overuse needs to be explored as it may impair individual well-being. A nationally representative survey explored the extent of perceived digital overuse (PDO) and tested its relation to social digital pressure, digital coping skills, and, to assess everyday offline relevance, to individual subjective well-being. Results indicated that 28% of Swiss Internet users pereived digital overuse, which was strongly and negatively associated with well-being. Social pressure was positively related to overuse. Differences in experiencing and dealing with digital overabundance are highly relevant to general well-being and need to be further researched in light of social change and ICT innovations.

Keywords

well-being, digital overuse, structural equation modeling, digital skills, digital pressure

Introduction: Abundance of Digital Information and Communication

Digital information and communication technologies (ICTs) are the default infrastructure for societal participation in many countries, be it for information seeking, socializing, or entertainment (Graham & Dutton, 2014). Various forms of partaking in the digitized society are beneficial for well-being (see, for example, Amichai-Hamburger, 2007; Lissitsa & Chachashvili-Bolotin, 2016). However, the overabundance of Internet-based digital information and communication options also presents a potential impairment to personal well-being (Gui, Fasoli, & Carradore, 2017). The main contribution of this article is the conceptualization and empirical assessment of perceived digital overuse (PDO) in relation to subjective well-being (SWB).

This does not imply that the Internet is a harmful medium per se; there are undeniably many valuable information and communication options online. Rather, it appears that those who manage to derive positive life outcomes from their use minimize the potential negative effects (Salo, Pirkkalainen, & Koskelainen, 2017). Accordingly, specific skills in coping with digital overabundance and in managing potential negative side effects of their digital participation may help users to maintain high well-being. In this process, the social context, understood as the everyday relevance of Internet use, likely matters, too: both PDO and the need for mitigating coping skills are assumed to be more salient in social settings where the pressure to function digitally is high. Individuals who are constantly confronted with expectations and norms regarding their "digital functioning" as a form of social pressure may experience more overuse and would need particularly high coping skills.

The global digital divide narrative was put forward under the assumption that Internet access and use inevitably produce benefits. Limitations to the "the more the better" account have been problematic Internet use (Caplan, 2002; Tokunaga & Rains, 2016; Yellowlees & Marks, 2007) and Internet or smartphone addiction (Brand, Laier, & Young, 2014; Chóliz, 2010; Griffiths, 1996), mostly understood as clinically defined minority phenomena. And, more recently, neuroscientific (He, Turel, Brevers, & Bechara, 2017) and public health research (Domoff, Borgen, Foley, & Maffett, 2019) has started to examine the effects of excessive digital media use. However, public and academic discourse has also identified potential individual and societal harms apart

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from psychiatric diagnoses. In fact, research has pointed to perceptions of digital overuse as an impairment to well-being that affects larger parts of the population: in a large survey in the United Kingdom, 41% of Internet users agreed with the statement "I spend too much time online" (Ofcom, 2016, p. 32).

To take advantage of the Internet as a positive resource in everyday life, users frequently need to manage the overabundance of digital information and communication options. The point of departure for the present study is that Internet use can provide people with relevant information, entertainment, services, and social connections that are beneficial for well-being (Helsper & van Deursen, 2015)—but that a negative personal impact is expected when its use is experienced as too much. Although Internet users frequently experience a general sense of overuse, there is a gap in research on its prevalence, predictors, and consequences. The article focuses on PDO and SWB at the user level and contributes to the broader debate on how various facets of Internet use relate to happiness.

The Experience of Digital Overuse

Unlike problematic, compulsive, or excessive Internet use as a pathologic and thus minority condition, perceiving general digital overuse is an emerging social issue; it is less severe but much more common (Gui & Büchi, 2019). The ubiquity of the Internet and social media has set constant availability as a new societal standard. This is partly due to the emergence of algorithmic selection applications that recommend new entertainment content, compile personalized news feeds, or select relevant posts for infinite scrolling (Willson, 2017). Features like push notifications have the capacity to enable anytime and anywhere communication and availability, often by interrupting other ongoing (offline) activities. Social media firms have dedicated teams that try to make their services as "addictive" as possible (Leslie, 2016). By personalizing content combined with automated recommendations (e.g., YouTube, Facebook) and tailoring services specifically to the users' interests, these social media platforms aim at maximizing the time people spend engaging with them, and their profits. Consequently, the question arises whether users feel overburdened by this vast array of available communication and information options and how they manage their Internet use and social pressure. Digital overuse is thus a general and broad latent phenomenon that occurs when everyday Internet use surpasses an individual standard or vague sense of a personal optimum. This perception crosses different life domains, devices, and applications, and can therefore be seen as an accumulated, abstracted consequence of the interplay between specific usage patterns and technology push.

Importantly, this concept is subjective and relative—we do not imply that a specific threshold value for the amount of use is harmful. For instance, digital-screen engagement as an "objective" amount of use variable did not correlate with adolescent well-being with any practical significance (Orben & Przybylski, 2019a), supporting our rationale of conceptualizing overuse as an individual experience if it is to be relevant for well-being. We thus define PDO as the positive difference between the extents of practiced and desired Internet use, that is, the perceived excess of time allocated to Internet use in absolute, relative, and synchronistic terms. While the related but separate concepts of problematic Internet use or addiction rely on cutoff scoring (Kardefelt-Winther et al., 2017)—that is, the "desired" extent is exogenously defined by experts such as psychiatrists—PDO depends entirely on the individual and context: one person's overuse is another's lifeblood (see Bawden & Robinson, 2009, p. 187). Because the personally desired extent of Internet use is presumably a latent dimension of which users themselves may not be cognizant, the measurement needs to rely on indirect manifestations. Individuals can express when their use becomes overuse, without thinking about specific numbers, when it overall feels like too much, displaces other valued activities, or causes cognitive overload (also see Gui & Büchi, 2019; Gui et al., 2017).

We identify three concrete manifestations of PDO. First, a general feeling of spending too much *absolute* time online is the most straightforward indicator of overuse (Ofcom, 2016). While people may have difficulties in reporting accurate total time or frequency estimates (Scharkow, 2019), they are the experts on their own attitudes and perceptions. A second indicator of digital overuse is the feeling that Internet use regularly and perhaps subtly pushes other—and according to one's personal ideals, more important—things aside (see Hall, Johnson, & Ross, 2019). The concept of PDO thus foregrounds conflicts in the *relative* importance of everyday activities competing for time. This overallocation of time to Internet use relative to other valued activities also taps into deficient self-regulation associated with a tendency to procrastinate (Reinecke et al., 2018). Third, PDO likely manifests itself in negatively evaluated *synchronicity* of multiple online stimuli and feelings of overload (LaRose, Connolly, Lee, Li, & Hales, 2014; Yeykelis, Cummings, & Reeves, 2014). Overuse is thus reflected in the feeling that one is trying to do too many things at the same time online.

Given the public and academic debate about using "too much" technology, we first ask how users themselves assess their use, or more precisely, what proportion of Swiss Internet users feels they overuse the Internet. Thus far, studies are limited to understanding digital overuse as pathological, typically assessed in student populations (see Tokunaga & Rains, 2016). However, it is crucial to assess how widespread the perception of digital overuse as a societal phenomenon is, that is, in representative population-level surveys. To explore this, we formulate the following research question:

Research Question 1: To what extent do Internet users self-report digital overuse?

A Link to Theories of the Good Life: Subjective Well-Being

News reports on Internet overuse, generally focusing on social media or smartphones, often propose negative effects on individuals' mental health (e.g., Booth, 2019; Cornish, 2017; Klass, 2019). To assess whether digital overuse is relevant for well-being, we first need to determine the appropriate measurement of well-being. Both academia and policy makers have long pursued the goal of measuring the "good life" of individuals and societies, using various indicators to determine quality of life (Miao, Koo, & Oishi, 2013). While economic, political, or social macro conditions were previously regarded as the best indicators, SWB has recently received more attention as a way of measuring individual mental health. It is one important aspect of quality of life among other factors like physical health, societal living conditions, and economic measures (Michalos, 2014). SWB is a self-assessment of an individual's well-being in different life domains (for an overview, see Diener, Oishi, & Tay, 2018). Early research described a happy person as a "young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, high job morale, modest aspirations, of either sex and of a wide range of intelligence" (Wilson, 1967, p. 294); this was reassessed, leading to the finding that a happy person has a "positive temperament, tends to look on the bright side of things, and does not ruminate excessively about bad events, and lives in an economically developed society, has social confidants and possesses adequate resources for making progress toward valued goals" (Diener, Suh, Lucas, & Smith, 1999, p. 295).

The role of media and communication is absent or implicit in this literature. However, SWB has recently received increasing attention from communication research (e.g., Amichai-Hamburger, 2007; Burke & Kraut, 2016; Chan, 2015; Reinecke & Oliver, 2017; Valkenburg & Peter, 2007). Often, such research derives causal mechanisms regarding communication effects on well-being from the affordances of ICTs. A mostly separate line of scholarship using a digital inequality framework has primarily been concerned with social differences in Internet access and use (e.g., Brandtzæg, Heim, & Karahasanović, 2011; Büchi, Just, & Latzer, 2016). A crucial but under-researched addition here is the analysis of differential consequences of Internet use (Büchi, Festic, & Latzer, 2018; Van Deursen & Helsper, 2018). Thus far, outcomes of Internet use have particularly been studied in terms of tangible, concrete outcomes like finding a job or making friends online (Helsper & van Deursen, 2015). With the realization that such outcomes of Internet use can equally be of a subjective or mental nature (Büchi et al., 2018; Huang, 2010), adding SWB measures as an outcome is a step toward empirically assessing the social impact of the Internet more holistically by consolidating theoretical arguments from both lines of research.

Existing studies on the implications of usage differences generally show that individuals of higher social status seem to be taking greater offline advantage from their digital engagement, resulting in an amplification of existing inequalities (Hargittai & Hsieh, 2013). The digital inequality framework assumes that skilled Internet use can be personally, socially, and economically advantageous (Robinson et al., 2015). However, empirical studies show mixed results, likely due to a wide variety of operationalizations, and do not give a clear answer as to whether the Internet positively affects well-being in society (Çikrıkci, 2016; Huang, 2010, 2017). In research on Internet effects on social well-being with a representative sample for the Swiss population, digital participation through online information seeking or communication had no significant direct effect, although the perception of digital belongingness was directly related to social well-being, and Internet skills were indirectly related (Büchi et al., 2018). A reason for the absence of a net digital participation effect may be that positive and negative outcomes of Internet use occur simultaneously (Blank & Lutz, 2018). In a large survey of US teens, of which 95% have access to a smartphone, 45% believe social media has neither a positive nor negative effect on young people (Anderson & Jiang, 2018).

Internet use is multifaceted, and we need to further disaggregate it to reveal the effects of online engagement on well-being. While some amount of Internet use is a social requirement in the digital age, we argue that overuse can impair well-being. For instance, in a large-scale study of adolescents, Przybylski and Weinstein (2017) found a quadratic relationship between digital-screen time and mental well-being, albeit with small effect sizes, indicating that moderate use is most advantageous. Previous work has shown that differentiating between types of Internet use does not sufficiently disentangle the uncertain effects of Internet use on SWB (Büchi et al., 2018). Rather, it appears crucial to study a different dimension, namely perceptions of overuse, which arises from the adapted circumstances of Internet use in digitized societies.

Potential negative effects of Internet-enabled information and communication abundance such as Internet overuse have been identified (Gui et al., 2017; Stephens et al., 2017). In their theoretical work, Gui et al. (2017) identified the abundance of information and communication options in everyday life as a surplus that is difficult to manage, and its overuse can impair well-being; these dynamics have even evoked a somewhat overdrawn but in parts valid analogy to overconsuming food (Johnson, 2015). In related research, technostress has been linked to exhaustion, mental strain, and reduced productivity, as well as problems regarding concentration, sleep, identity, and social relations (Kushlev & Dunn, 2015; Salo et al., 2017). Sbarra, Briskin, and Slatcher (2019) compiled evidence on how smartphone and social networking site use negatively impact well-being through disruption of cognitive and relationship processes. In the workplace, perceptions of information, communication, and system feature overload were found to contribute to productivity losses (Karr-Wisniewski & Lu, 2010). Overall, there is an ongoing debate on the existence and magnitude of negative effects of

digital ICT uses on well-being, often fueled by research on adolescents (Bell, Bishop, & Przybylski, 2015; Livingstone, 2018; Orben & Przybylski, 2019b).

Drawing on representative data from the United Kingdom, the *Communications Market Report* (Ofcom, 2016) revealed that over 40% of the population feel they spend too much time online. A large proportion of these individuals further confirmed that their personal or professional life had suffered from that. Frequently mentioned consequences were missing out on sleep, interrupted face-to-face communication, less time spent with family and friends, or being late for work (Ofcom, 2016). We hypothesize that PDO is negatively related to individuals' personal well-being as an Internet-unrelated measure of quality of life.

Hypothesis 1: PDO is negatively associated with SWB.

Additional Contextual and Individual Factors

When investigating the relationship between PDO and SWB, other variables that concern an individual's social setting as well as their ability to cope with the challenges they face in their everyday Internet use must be considered.

Social Digital Pressure (SDP)

Usage patterns of ICTs are interrelated with existing social norms. For example, a couple of decades ago, "new owners of telephone answering machines were commonly concerned about obligations to monitor their machines constantly and return calls expeditiously" (Mick & Fournier, 1998, p. 137). Today, this "soft coercion" (Ling, 2016) includes expectations regarding online responsiveness, skills, and social presence (Gui & Büchi, 2019). Social digital pressure (SDP) thus reflects the norm or perceived societal expectation to function digitally and to be able to manage everyday challenges of digital media. As a context variable, it concerns the practical relevance of digital overabundance to one's everyday life. Depending on people's job situation and social setting, the degree to which they are expected to deal with new technologies varies greatly. Individuals who face higher pressure to function digitally in their everyday lives are at a higher risk of perceiving Internet overuse.

Hypothesis 2: SDP is positively associated with PDO.

Digital Coping Skills (DCS)

Digital communication abundance does not necessarily or automatically degrade well-being. We propose that specific DCS, which enable Internet users to manage potential negative side effects of digital participation and avoid feeling overburdened, enable functional and personally beneficial Internet use. While there has been some research on potential organizational mitigating mechanisms to combat technology overuse, little attention has been paid to how users cope with the risk of digital overuse (Salo et al., 2017).

Internet users generally cope with risks through self-help, for instance, privacy protection (Park, 2013) or trying to influence algorithms (Bucher, 2017; van der Nagel, 2018). Fraser and Kitchin (2017) summarize these actions individuals take to "oppose, evade, alter, or otherwise navigate their way around emerging problems" (p. 3) as "slow computing." In countering the risk of digital overuse, the relevant skills concern selective and goal-oriented use. Analogously to Bawden's theorization of information overload (Bawden, Holtham, & Courtney, 1999; Bawden & Robinson, 2009), some users have the competence to avoid feelings of powerlessness against the technological push and take control of their use. Gui et al. (2017) note that "they [users of digital media] increasingly need specific skills to channel digital stimuli towards personal goals and benefit, avoiding excessive multi-tasking, fragmentation of daily time and overconsumption of new media" (p. 155).

Hypothesis 3: DCS are negatively associated with PDO.

DCS are not only presumed to have a mitigating effect on digital overuse, but we also argue that this specific set of skills is positively associated with SWB (Leung, 2010). Acquiring new skills can induce a sense of achievement by being able to cope with new technologies and handle-associated challenges well (Nimrod, 2014). DCS may increase a feeling of autonomy, competence, and self-efficacy and are therefore expected to have a positive relationship with SWB.

Hypothesis 4: DCS are positively associated with SWB.

The relevance of these coping skills is likely to be context-dependent: we expect them to be more important in social settings where the pressure to function digitally is generally high. When the pressure to respond to messages quickly or be able to use various Internet applications is high in an individual's environment, they are exposed to a higher risk of feeling overburdened and experiencing perceived overuse. They therefore need to master specific skills to mitigate this possibility. In settings where this pressure is low, Internet users need fewer coping skills and are less susceptible to overuse and its effects on well-being.

Hypothesis 5: The association between DCS and SWB is moderated by SDP (such that the positive association between DCS and SWB is stronger for users who experience higher SDP).

Our theoretical arguments and review of existing studies have not led to any hypotheses regarding the relationship between SDP and SWB and the relationship between SDP and digital coping skills (DCS).

Covariates

Sociodemographic characteristics like sex, age, and education have long been shown to correlate with measures of how the Internet is used (e.g., Brandtzæg et al., 2011; Büchi et al., 2016). In addition, given that we are looking at perceived overuse, the amount of actual use may also be relevant. How the actual amount of Internet use relates to individual well-being is an empirically unsolved question and highly dependent on the operationalization of both variables (e.g., Huang, 2010; Przybylski & Weinstein, 2017). In this study, we see individuals' amount of Internet use and standard sociodemographic characteristics as control variables to consider when detecting the relationship between overuse on well-being.

Method

Nationally Representative Survey Data

The analysis uses original data from a nationally representative computer-assisted telephone survey conducted in 2017 in Switzerland ($N = 1{,}120$). It included a module on digital well-being to address the research question and hypotheses of this study. Using random digit dialing, respondents were contacted and interviewed through landline (80%) or mobile phone (20%). In this general population survey, to ensure representativeness, sampling quota were constructed based on age, sex, and region (Latzer, Büchi, Festic, & Just, 2017). Analyses reported below exclude non-users of the Internet, resulting in an effective sample of $N = 1{,}011$ Internet users. This sample comprised 50% women and the median age was 46 years (range: 14–93). A total of 34% had a tertiary education degree and 68% were employed full time or part-time; 19% were students and 12% were retired.

Missing values were rare and mainly concerned the Internet activity items used to construct the measure of the amount of use. The highest percentage of missing values (1.48%) was identified for the item asking respondents how frequently they consumed erotic content online. Multiple imputation by chained equations was used to obtain a complete data set (Azur, Stuart, Frangakis, & Leaf, 2011; van Buuren & Groothuis-Oudshoorn, 2011). Comparisons between summary statistics of the original and the imputed data set columns showed no significant differences.

Measures

Perceived digital overuse. The items for PDO were newly developed in a larger project on digital well-being, pretested in a student sample, and cross-validated in a large, population-level survey in a second country (see Gui & Büchi, 2019). Respondents were asked to what extent they agreed with the following three statements (1 = *completely disagree*, 5 = *completely agree*) about how they personally evaluate their Internet use: "I spend more time on the Internet than I would like," "I often try to do too many things at the same time when I am online," and "When I use the Internet, I lose time for more important things." The initial items for overuse also draw on the *Communications Market Report* (Ofcom, 2016), which asked about neglecting other aspects of life to make time for online activities and the feeling of spending too much time online, as well as on the theoretical work by Gui et al. (2017). To keep PDO viable as an instrument in larger surveys, it was limited to three items.

Subjective well-being. SWB was measured using the Warwick–Edinburgh Mental Well-Being Scale (WEMWBS), which was developed for population surveys (Stewart-Brown et al., 2011; Tennant et al., 2007). It covers the hedonic and eudaimonic aspects and central indicators of SWB (positive affect, psychological functioning, and interpersonal relationships). The short-form scale consisting of seven items was used, asking respondents to pick the category that best represented their experience in the last 2 weeks in response to the following statements (1 = *none of the time*, 2 = *rarely*, 3 = *some of the time*, 4 = *often*, 5 = *all of the time*): "I've been feeling optimistic about the future," "I've been feeling useful," "I've been feeling close to other people," "I've been feeling relaxed," "I've been dealing with problems well," "I've been thinking clearly," and "I've been able to make up my own mind about things."

Social digital pressure. The users' context, the social pressure regarding the use of the Internet, that is, SDP, was measured by asking respondents to what extent they agreed with the following three statements (1 = completely disagree, 5 = completely agree): "In my everyday life, people expect that I am capable of using various Internet applications," "In my everyday life, people expect that I reply quickly to messages," and "In my everyday life, people expect me to be active on social networking sites." These items build on previous work on perceived norms (Fishbein & Ajzen, 2011); for instance, the communication norm or expectation that one is constantly available (Ling, 2016; Reinecke et al., 2017).

Digital coping skills. To measure people's DCS, we asked respondents to rate their agreement with the following three statements (1 = *completely disagree*, 5 = *completely agree*): "I am able to selectively choose people or information sources to follow online," "I am able to set up my Internet devices or services so that they do not disturb me," and "I am able to distinguish Internet activities that are important for me from those that are not."

Amount of Internet use. A measure for the amount of Internet use was constructed by summing the frequencies (0 = *never*, 5 = *several times a day*) of using 35 diverse Internet applications (e.g., online messaging, checking facts, streaming videos, or social media use; see Blank & Groselj, 2014 for a discussion of this measure). The theoretical range was 0–175, the empirical range was 1–111 ($M = 51.12$, median = 51, $SD = 19.62$).

Sociodemographic variables. Respondents' level of education, employment status, age (in years), and sex (0 = *male*, 1 = *female*) were measured. Education was recorded using

Table 1. Analytical Strategy.

	Descriptive statistics	(Moderated) regression analysis	Structural equation model
Research Question 1	•		
Hypothesis 1		•	•
Hypothesis 2			•
Hypothesis 3			•
Hypothesis 4		•	•
Hypothesis 5		•	

five categories. The variable was subsequently recoded into three categories: low (primary or secondary school), medium (vocational school, A-levels or high-school graduation), and high education (university, university of applied sciences). Employment status was recorded as currently employed full time, part-time, or unemployed.

Analytical Strategy

First, we report descriptive statistics to answer Research Question 1. Confirmatory factor analysis (CFA) tested the measurements of the latent variables. The multivariate statistical methods then included regression and moderation analysis to test Hypotheses 1, 4, and 5, including control variables and structural equation modeling (SEM) to address Hypotheses 2 and 3 and to retest the nomological network of latent variables in light of the regression analysis results (see Table 1). All analyses were performed in the software *R*; the *lavaan* package (Rosseel, 2012) was used for CFA and SEM, with unweighted least squares (ULS) estimation and polychoric correlations given the ordinal measurement of the indicator items (Forero, Maydeu-Olivares, & Gallardo-Pujol, 2009). Models were assessed using conventional cutoffs from the CFA and SEM literature (Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003).

Results

Descriptive Statistics

To answer Research Question 1, the descriptive statistics of the three indicators of PDO are reported. The mean for the question about spending too much time online (absolute PDO) was 2.51; for doing too many things at the same time (synchronistic PDO), it was 2.27, and 2.64 for losing time for more important things (relative PDO).

These values were just below the middle of the answer scale. The most prevalent feeling of digital overuse thus concerned relative time allocation, but the means for the other two items were fairly similar. Calculating the mean of the three indicators for each respondent revealed that 28% experienced overuse in that they scored higher than the scale middle of 3. Figure 1 shows the distribution of responses: the modal response category was 1 for all three items, indicating generally low overuse. At the other end, we do see that sizable proportions of the population express digital overuse—between 20% and 28% *agree* (4) or *completely agree* (5) with the statements. Furthermore, if we take the maximum response value for any of the three items for each individual and again combine agreement values 4 and 5, 46% report overuse. That is, nearly half of Internet users agree with at least one of the three statements about overuse. Don't know answers or refusals were very rare (0.6%).

Measurement Model

A combined CFA was performed with the four multi-item measures as a precondition to extract factor scores for regression analysis and to use latent variables in SEM (see Supplemental Figure A1). The proposed structure of loadings was well supported by the data, $\chi^2(97, N = 1{,}011) = 335.71$, $\chi^2/df = 3.46$, CFI = .964, TLI = .955, RMSEA = .049, SRMR = .049, with only one minor modification (a freely estimated covariance between the residual variances of two items of the SWB factor was added, see Online Appendix). Hence, the empirical pattern of salient and non-salient factor loadings validates our items proposed to measure the four latent variables of theoretical interest.

Regression and Moderation Analysis

Factor scores were predicted and saved from the CFA for subsequent regression and moderation analysis. The model regressed SWB as the dependent variable on PDO, DCS, SDP, the product of DCS and SDP, amount of use, age, employment, education, and sex (Table 2).

PDO had a negative effect on SWB, $b = -.35$, $t(999) = -15.45$, $p < .001$. DCS had a positive effect, similar in absolute effect size, $b = .41$, $t(999) = 17.28$, $p < .001$. None of the demographic control variables nor the amount of Internet use had significant effects on well-being. The effect of SDP was small but positive and significant, $b = .16$, $t(999) = 5.02$, $p < .001$. The interaction term between SDP and DCS was positive, but not significant, $b = .06$, $t(999) = 1.66$, $p = .097$. That is, the estimated coefficient for the effect of DCS on SWB is greater for higher values of SDP: for example, it is .46 for above-average SDP of 1 compared with .34 for below-average SDP of –1, but given the sparsity of data for very low or very high values of SDP, the 95% confidence interval for the coefficient estimation includes the point estimate for the mean level of SDP, that is, 0 ($b = .41$) (see Table 2).

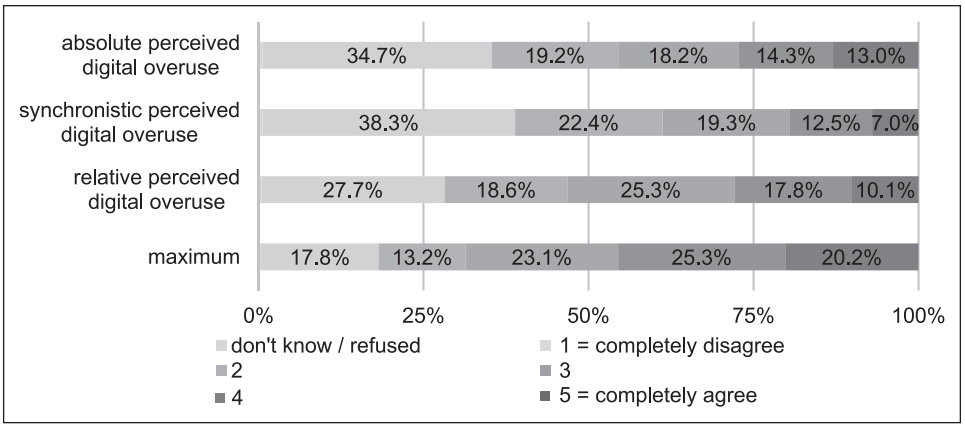

Figure 1. Distribution of indicators of perceived digital overuse.
Maximum refers to the proportion of the highest response to any of the three indicators.

Table 2. Moderated Regression Analysis of SWB.

	Unstd. *b*	*SE*	*t*	*p*	Std. *b*
(Intercept)	–.063	.071	–0.89	.374	.000
PDO	–.354*	.023	–15.45	.000	–.507
DCS	.406*	.024	17.28	.000	.474
SDP	.161*	.032	5.02	.000	.170
DCS × SDP	.055	.033	1.66	.097	.039
Amount of use	.0003	.001	0.39	.700	.012
Age	.0006	.001	0.72	.472	.021
Part-time employed	–.027	.030	–0.91	.364	–.025
Full-time employed	.018	.030	0.64	.524	.019
Medium education level	.011	.028	0.39	.697	.010
High education level	–.020	.020	–1.02	.306	–.025
Female	.024	.026	0.914	.361	.024

SE: standard error; PDO: perceived digital overuse; DCS: digital coping skills; SDP: social digital pressure.
$F(11, 999) = 85.83$, $p < .001$, adjusted $R^2 = .48$. Omitted categories: unemployed, low education level, male
*$p < .001$.

A very high proportion of the variance in SWB was explained by the predictors, $F(11, 999) = 85.83$, $p < .001$, $R^2 = .48$. Omitting the non-significant interaction term in an updated regression model resulted in virtually identical parameter estimates and fit, $F(10, 1{,}000) = 93.97$, $p < .001$, $R^2 = .48$. In summary, the regression analysis provided strong support for Hypotheses 1 and 4, whereas Hypothesis 5 was rejected.

Structural Equation Model

First, we evaluated the global fit and found that the proposed model fit the empirical covariance matrix well: $\chi^2(97, N = 1{,}011) = 335.71$, $\chi^2/df = 3.46$, CFI = .964, TLI = .955, RMSEA = .049 (95% CI = [.044, .055]), SRMR = .049. Given that the SEM and the four-factor CFA measurement model were both saturated including the same set of latent and manifest variables, the global fit measures were identical; however, the structural path estimates still differed, given the assumption of endogeneity for PDO and SWB in the SEM. Figure 2 shows a graphical representation of the model with standardized estimates and Table 3 provides all estimates.

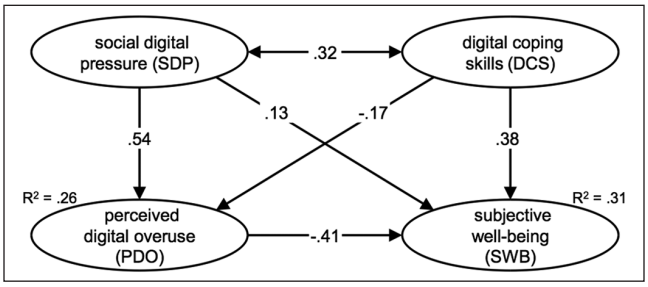

Figure 2. Structural equation model.
Standardized regression estimates are shown. See Table 3 for full model results.

The path estimates (all $p < .001$ unless otherwise noted) show that PDO had a substantial negative effect on SWB, while DCS had a nearly equal but positive effect. Again, SDP weakly and positively predicted well-being, in this model, non-significantly ($p = .054$). In the SEM, PDO was modeled as a mediator: SDP very strongly and positively affected overuse and DCS affected it weakly and negatively. SDP and DCS correlated positively.

The results from the SEM approach confirm the regression analysis as they support Hypotheses 1 and 4. In addition, treating PDO as an endogenous variable in SEM made it possible to test Hypotheses 2 and 3, which were both supported.

Model Robustness Checks

The results of the structural equation model were cross-checked with different estimators, different standard error calculations and control variables. The results reported above used ULS estimation and bootstrapped standard errors with 10,000 draws, which we deemed most appropriate for the

Table 3. Parameter Estimates of the Structural Equation Model.

		Unstd.	*SE*[a]	*Z*	*p*	Std.	R^2
Regressions							
SWB	←						.308
	PDO	–.282*	.042	–6.72	.000	–.409	
	DCS	.300*	.053	5.65	.000	.380	
	SDP	.121	.063	1.93	.054	.133	
PDO	←						.259
	SDP	.704*	.077	9.16	.000	.538	
	DCS	–.197*	.062	–3.19	.001	–.174	
Covariances							
DCS	↔						
	SDP	.146*	.027	5.34	.000	.324	
useful	↔						
	feelclose	.241*	.040	6.08	.000	.317	
Latent variables							
SWB	→						
swb1	future	1[b]				.568	.322
swb2	useful	.960*	.083	11.62	.000	.545	.297
swb3	feelclose	.732*	.080	9.12	.000	.415	.172
swb4	relaxed	.911*	.072	12.68	.000	.517	.267
swb5	dealwell	1.114*	.080	13.88	.000	.632	.400
swb6	thinkclear	1.190*	.096	12.42	.000	.676	.456
swb7	ownmind	1.106*	.087	12.77	.000	.628	.394
DCS	→						
dcs1	select	1[b]				.719	.518
dcs2	nodistract	.858*	.081	10.60	.000	.617	.381
dcs3	important	.927*	.090	10.29	.000	.667	.444
PDO	→						
pdo1	absolute	1[b]				.817	.667
pdo2	synchronistic	.902*	.055	16.52	.000	.737	.543
pdo3	relative	.866*	.048	18.02	.000	.708	.501
SDP	→						
sdp1	expquick	1[b]				.624	.389
sdp2	expskills	1.267*	.106	11.91	.000	.790	.625
sdp3	expsns	.946*	.076	12.44	.000	.590	.348

SE: standard error; SWB: subjective well-being; PDO: perceived digital overuse; DCS: digital coping skills; SDP: social digital pressure.
Single-headed arrows indicate regressions; double-headed arrows indicate covariances.
χ^2 (97, *N* = 1,011) = 335.71, CFI = .964, TLI = .955, RMSEA = .049, SRMR = .049. See Figure 2 for graphic representation.
[a]Standard errors computed with 10,000 bootstrap draws.
[b]Fixed to unity.
*$p < .001$.

nature of our data; the CFI was .964 and the RMSEA was .049. Maximum likelihood (CFI = .943, RMSEA = .042) and diagonally weighted least squares estimation (CFI = .976, RMSEA = .045) produced similar fit measures. Using robust standard errors instead of bootstrapping consistently yielded larger standard errors in the range of 10%–15% difference. Accordingly, the *p*-values reported above are on the conservative side. Additional models, including all sociodemographic control variables entered in the regression analysis, or alternatively retaining only those that were significant compared with the model reported above, naturally produced slightly different estimates, but none of the results regarding the tenability of the hypotheses were affected. For example, in a model with all control variables, the standardized effect of PDO on SWB was –.39 ($p < .001$), compared with –.41 ($p < .001$) in Figure 2. All of these analyses are documented here: https://osf.io/b74ce/?view_only=7dc61ab2438b43dcbd7e4795f13797fd.

Discussion and Limitations

Many people experience digital overuse—in our study of Swiss Internet users, 28% had a mean score higher than the scale middle. In multivariate analyses, higher PDO was substantially related to lower well-being. DCS were positively associated with well-being and social pressure was positively associated with overuse. The abundance of digital information and communication options in everyday life is a social fact in Switzerland and many other countries (although there remains a shrinking proportion of people who cannot or do not want to use the Internet, see Latzer et al., 2017)—this macro condition impacts individuals' perceptions and actions. In this context, we find that differences in dealing with and experiencing digital overabundance relates to individuals' SWB. The regression and structural equation models were able to explain a very high percentage of the variance in SWB (48% and 31%, respectively). SWB (positive thoughts and feelings relating to one's recent everyday life) as the outcome measure of this study and the Internet-use-related variables (overuse, pressure, and skills) as predictors are very distinct, yet the results revealed strong associations between them. This leads to the conclusion that overuse is not solely relevant on a "digital level." Rather, as the boundaries between an individual's online and offline lifeworld become increasingly blurred, digital overuse will become a more pressing social issue.

It is important to acknowledge the cross-sectional nature of the data in interpreting the results. While the models include directional paths that represent our theoretical assumptions, the empirical results are correlational and cannot rule out omitted-variable bias or reverse causality. Overall, the measures for PDO, SDP, and digital coping would benefit from further validation. For instance, the item asking about the expectation of being active on social networking sites may be problematic as it represents a separate dimension. Agreement to this item may correlate differently with sociodemographic variables than the other SDP items about digital skills and responsiveness. Future operationalizations should therefore reassess the dimensionality of this construct. The items measuring PDO referred to "the Internet," yet respondents' understanding of this term may vary depending on their specific uses and experiences. A challenge for future work will thus involve finding appropriate terminology to capture the digital ICT repertoire to which PDO pertains; perhaps qualitative

inquiry would show that such precision is only possible for more narrowly defined populations or applications.

Contrary to our assumption expressed in Hypothesis 5, there was no significant interaction such that the positive effect of DCS on SWB would be stronger for users who experience higher SDP. It may be that the social level is less relevant here and the mechanism is more psychological: if a user needs or wants to use the Internet a lot (but does not necessarily experience the expectation that they do), then DCS become more important for well-being. In future research on overuse involving the effects of social norms, human values and personality traits may be promising additional predictors. Research on media use and well-being has also addressed the role of self-control—avoiding digital overuse may be contingent upon the ability to resist "sweet temptations" (Hofmann, Reinecke, & Meier, 2017).

The results showed a small but positive effect of SDP on SWB; we lack a clear theoretical explanation for this, but it may be that the digital pressure measure is confounded with social connectedness which is positively tied to well-being. In experimental research where social pressure was manipulated, it in fact had a negative effect on well-being by reducing competence in a sample of smartphone users (Halfmann & Rieger, 2019). Presumably, there is also a third variable in play that is associated both with digital pressure and SWB, such as employment or professional engagement. Individuals in more high-performance jobs would perceive higher digital pressure but at the same time reap well-being benefits from their professional achievements (we included employment status in the regression analysis, which showed no effect, but lack more detailed data to explore this possibility further).

This article is aligned with research on the broad question and public debate on how Internet use relates to happiness. We contribute a countrywide, representative analysis of digital well-being beyond a single service or platform. Existing studies have shown positive, negative, or zero effects, depending on the specific operationalizations of Internet use and happiness (Huang, 2017; Leung, 2010; Orben, Dienlin, & Przybylski, 2019). An important novel contribution of the present study is the focus on overuse in this context—after decades of a prevailing "the more the better" narrative. Contrary to more techno-deterministic or prescriptive interpretations of overuse (e.g., Montag & Walla, 2016), the insight is not that intense use necessarily equals overuse and is thus "bad," but rather that ICT innovations and social change require adaptive behavior from individuals intent on maintaining high personal well-being. At the social level, the historically rapid diffusion of the Internet and connected devices has produced a cultural delay, meaning that the modification of social norms that would protect against overuse is lagging behind technological developments (Gui & Büchi, 2019). For digital inequality research, the association between PDO as a second-level variable and SWB as a third-level variable is highly relevant; in combination with the finding that higher levels of education are associated with lower overuse (Gui & Büchi, 2019), future research needs to address the potential causal chain from offline status markers through Internet use variables to differences in well-being. It appears that in some contexts of a digitized society, digital inequality is shifting from scarcity to overabundance.

With the rise of digital, networked, and continuous communication in everyday life, social functioning—an individual's "ability to fulfill their role within environments such as work, social activities, and relationships" (Bosc, 2000, p. 63)—has met significant new challenges. In this vein, the study's results help further develop the notion of digital well-being—understood as a shorthand term for the maintenance of SWB in a social environment characterized by the digitization of all life domains and the constant abundance of digital information and communication options as a default. We need updated theoretical perspectives to grasp the mutual dependencies of ICTs and social life, that is, to explain well-being not as a function of technology itself, but of its ensuing individual and social harms (e.g., overuse, online harassment, manipulation based on digital traces) and benefits (e.g., relevant information, online social capital, economic efficiency). Future theoretical and empirical research can further differentiate and add to these factors, positive and negative.

Conclusion

PDO, a widespread perception among Internet users in a digitized society that is among the happiest in the world (Helliwell, Layard, & Sachs, 2018), is strongly associated with individual well-being. At the same time, we have shown that specific skills in coping with the everyday strains of information and communication abundance can offset its negative impacts. This study points to digital overuse as a social issue and stresses the importance of a new set of skills that is necessary to cope with such challenges of the digital age, both in academic research and policymaking. Further theoretical and empirical research is needed to address the challenge of how individuals can maintain high well-being in a digital society—sometimes despite and sometimes thanks to the pervasiveness of digital ICTs in virtually all life domains.

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Supplemental Material

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